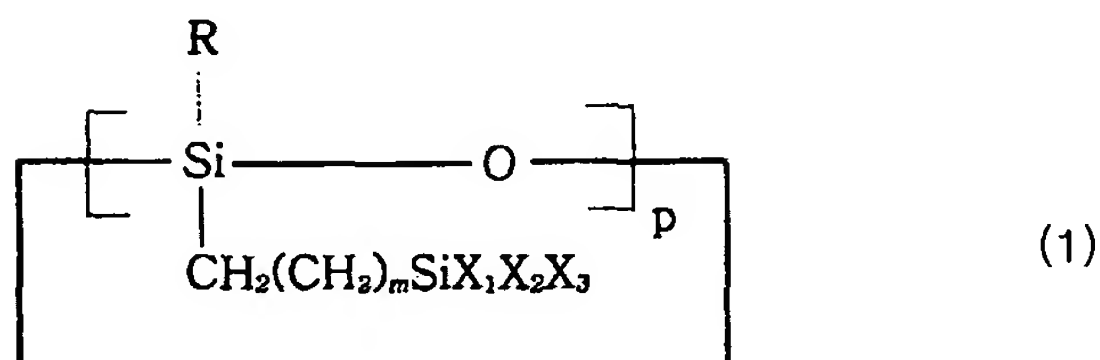


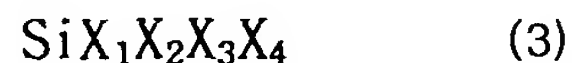
**WHAT IS CLAIMED IS:**

1. A siloxane-based resin prepared by hydrolyzing and polycondensing a  
 5 cyclic siloxane compound of formula (1), together with a silane compound  
 of formula (3) and/or a silane compound of formula (4), in an organic  
 solvent in the presence of a catalyst and water:



wherein,

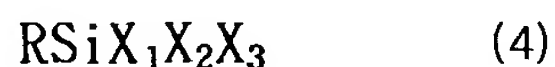
- 10 R is H, C<sub>1-3</sub> alkyl, C<sub>3-10</sub> cycloalkyl, or C<sub>6-15</sub> aryl;  
 each of X<sub>1</sub>, X<sub>2</sub>, and X<sub>3</sub> is, independently, C<sub>1-3</sub> alkyl, C<sub>1-10</sub> alkoxy, or halo,  
 provided that at least one is alkoxy or halo;  
 p is an integer from 3 to 8; and  
 m is an integer from 1 to 10;



15

wherein,

each of X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>, and X<sub>4</sub> is, independently, C<sub>1-10</sub> alkoxy, or halo;

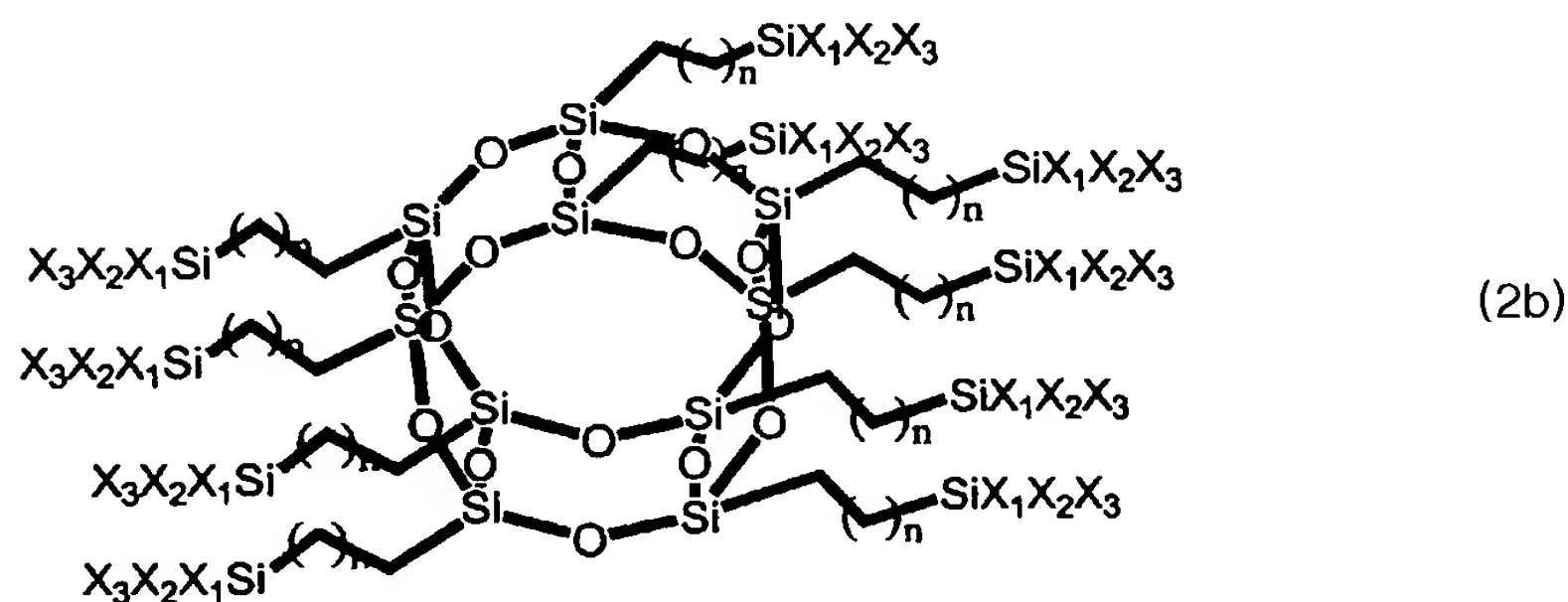
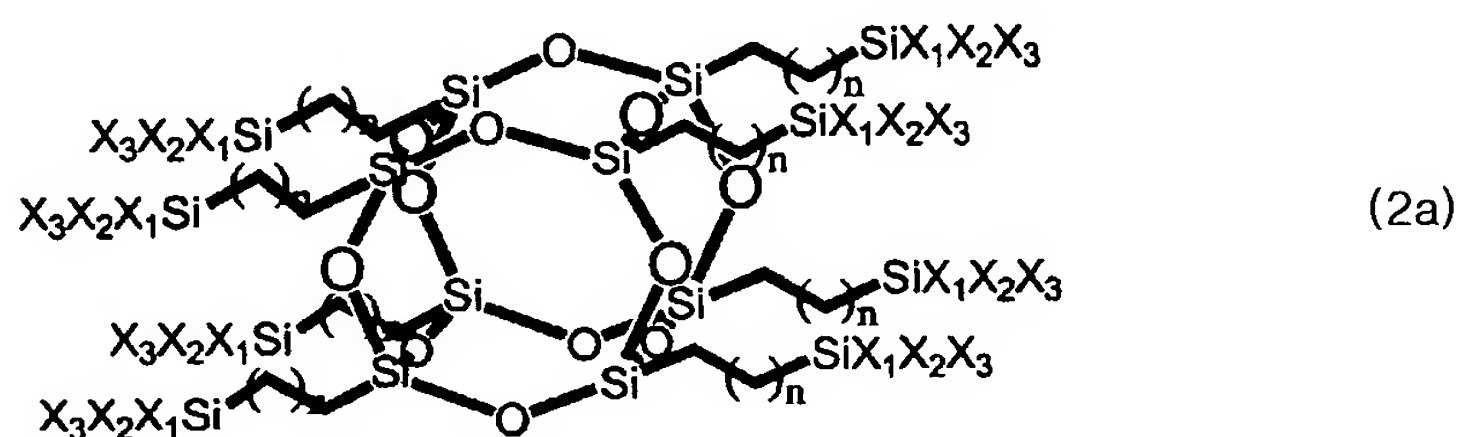


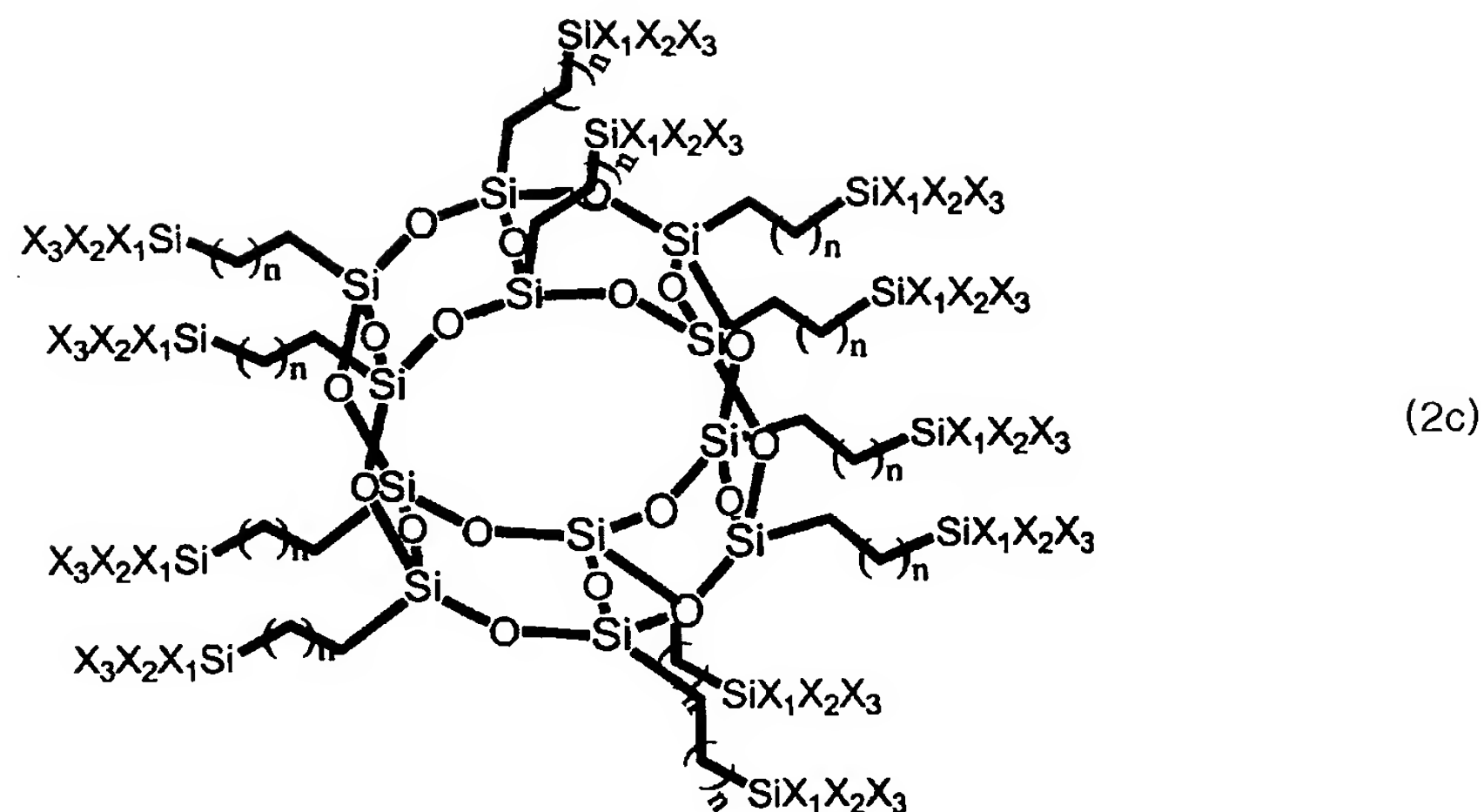
wherein,

- 20 R is H, C<sub>1-3</sub> alkyl, C<sub>3-10</sub> cycloalkyl, or C<sub>6-15</sub> aryl; and

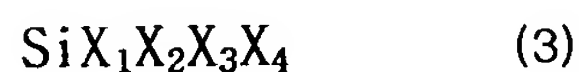
each of  $X_1$ ,  $X_2$ , and  $X_3$  is, independently,  $C_{1-3}$  alkyl,  $C_{1-10}$  alkoxy, or halo, provided that at least one is alkoxy or halo.

2. The siloxane-based resin according to claim 1, wherein the resin is prepared by hydrolyzing and polycondensing a cage-shape siloxane compound of any of formulas (2a) through (2c), together with a silane compound of formula (3) and/or a silane compound of formula (4), in an organic solvent in the presence of a catalyst and water:

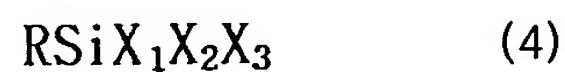




in the above formulas (2a) through (2c),  
each of  $X_1$ ,  $X_2$ , and  $X_3$  is, independently,  $C_{1-3}$  alkyl,  $C_{1-10}$  alkoxy, or halo,  
provided that at least one is alkoxy or halo; and  
5  $n$  is an integer from 1 to 12;



wherein,  
each of  $X_1$ ,  $X_2$ ,  $X_3$ , and  $X_4$  is, independently,  $C_{1-10}$  alkoxy, or halo;



10 wherein,  
 $R$  is H,  $C_{1-3}$  alkyl,  $C_{3-10}$  cycloalkyl, or  $C_{6-15}$  aryl; and  
each of  $X_1$ ,  $X_2$ , and  $X_3$  is, independently,  $C_{1-3}$  alkyl,  $C_{1-10}$  alkoxy, or halo,  
provided that at least one is alkoxy or halo.